

CESTODES FROM CORMORANTS FROM SOUTH AUSTRALIA

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SUMMARY

This paper deals with six species of cestodes from South Australian cormorants. It was found on examination of the type material that Goss (1940) had confused two species in her description of *Paradilepis minima*. These two species are redescribed and identified as *Paradilepis scolecina* (Rudolphi 1819) and *Paradilepis minima* (Goss 1940, in part). *Paradilepis* sp. is recorded but not named, as the material was inadequate. *Dilepis maxima* Goss 1940, *Hymenolepis cormoranti* Ortlepp 1938 (Woodland 1929) are redescribed from fresh material.

From the one bird found in Adelaide, a little pied cormorant, *Microcarbo melanoleucus* (syn. *Phalacrocorax ater*) we obtained a specimen of *Dilepis maxima* Goss 1940, two fragments recorded as belonging to a species of *Paradilepis*, and numerous specimens of *Hymenolepis phalacrocorax*. The latter also occurred in four little pied cormorants collected at Tailem Bend, together with numerous specimens of *Paradilepis minima* (Goss 1940). The latter were also found in two little black cormorants, *Phalacrocorax sulcirostris*. In another little pied cormorant from Tailem Bend we found thirteen specimens of *Hymenolepis cormoranti* Ortlepp 1938. Many specimens of *Paradilepis scolecina* (Rudolphi 1819) were obtained from one black cormorant (*Phalacrocorax carbo* var. *novae-hollandiae*).

This work was started under the direction of the late Professor T. Harvey Johnston, with the intention of producing a joint publication, which was unfortunately prevented by his death in 1951. I should like to express my gratitude for his great help with the paper, while making it clear that the opinions expressed are the sole responsibility of the author. Thanks are due to Messrs. G. G., Fred and Bryce Jaensch of Tailem Bend, and the late Mr. L. Ellis of Murray Bridge for obtaining the birds from Tailem Bend for us. I also wish to thank Miss Goss, formerly of University of Western Australia, for very kindly allowing me to re-examine her slides of *Paradilepis minima*. The work was done with the assistance of the Commonwealth Research Grant to the University of Adelaide.

Paradilepis scolecina (Rudolphi 1819)

Figs. 1-9

Syn. *Paradilepis duboisi* Hsü 1935; *Paradilepis brevis* Burt 1940;
Dilepis minima Goss 1940 (in part).

Numerous specimens were obtained from *Phalacrocorax carbo* var. *novae-hollandiae* shot at Tailem Bend, S.A. Those with eggs measure 3.5-4.5 mm. long with a maximum breadth of 0.32-0.44 mm. and have about 80 segments, all broader than long.

The scolex is 0.42-0.48 mm. (average 0.47 mm.) in diameter. The broad muscular rostellum, 0.17-0.2 mm. in maximum diameter when everted, has 20 hooks arranged in a double crown, the two series alternating and with hooks differing in shape and size (Figs. 2 and 3). The anterior hooks measure 0.111-0.114 mm., average 0.112 mm., in total length, the posterior 0.075-0.081 mm. (average 0.079 mm.) in total length; all have a long dorsal and a short ventral root. These hooks are readily lost and hence were not present in much of our material. The large rostellar sac extends back almost to the level of the posterior

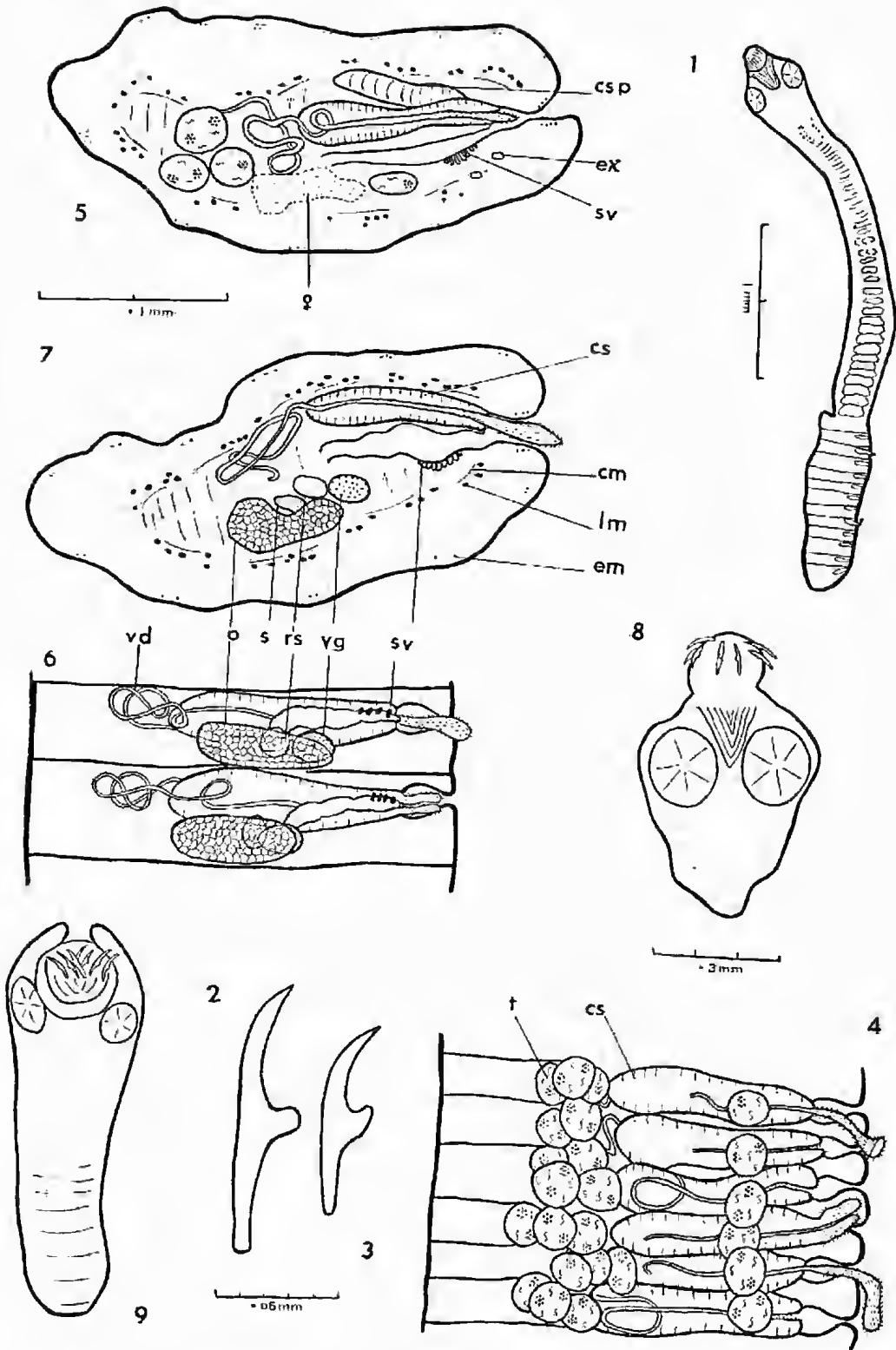


Plate 1.

Figs. 1-9.—*Paradilepis scolecina*. 1, mature cestode; 2 and 3, rostellar hooks; 4, ventral view of segments with mature testes; 5, transverse section of same; 6, ventral view of segments with mature ovaries; 7, transverse section of same; 8 and 9, young forms. Figs. 2 and 3 to same scale; Figs. 4, 5, 6 and 7; Figs. 8 and 9. cm, circular muscle; cs, cirrus sac; csp, cirrus sac from preceding segments; m, outer ring of longitudinal muscle; ex, excretory vessel; lm, inner ring of longitudinal muscle; o, ovary; rs, receptaculum seminis; s, shell gland; sv, sphincter of vagina; t, testis; vd, vas deferens; yg, yolk gland.

margin of the suckers. The latter are hemispherical or slightly ellipsoid and measure 0.1-0.14 mm. in diameter or 0.11-0.12 by 0.14-0.15 mm. The scolex merges into a neck varying in length and width according to the state of contraction.

Segments just behind the neck are 0.32-0.44 mm. broad by 0.02 mm. long. They narrow slightly (to 0.25-0.29 mm.) and gradually lengthen as they mature, becoming 0.03 mm. long at sexual maturity, 0.04 mm. long in segments with a developing uterus, increasing to 0.12 mm. in those with a gravid uterus. Some strobilae show a sudden increase in width when the uterus is fully developed.

Calcareous corpuscles are elliptical. The outer longitudinal muscle ring consists of a few scattered fibres in the cortical region. The inner ring contains much larger fibres. The genital ducts pass outwards dorsally to both excretory canals.

In our specimens the testes tend to become displaced so that the organs may overlie in such a way as to make it difficult to distinguish them in whole mounts. The cirrus sac is so large that it occupies a considerable part of the segment at male or female maturity. The four testes develop before the ovary and have disappeared by the time the latter is fully developed. One testis lies porally and ventrally to the cirrus sac, the other three being on the aporal side. When mature they measure 0.026-0.037 mm. The vas deferens is very long, its numerous coils lying dorsally to the three aporal testes. The duct is also thrown into loops in the inner part of the cirrus sac but seminal vesicles were not recognizable. The cirrus is armed with small spines and must be relatively very long, about 0.06-0.07 mm. when fully everted. The cirrus sac may measure 0.12-0.15 by 0.03 mm., but is somewhat smaller in gravid segments. The genital atrium may be deep and narrow (0.026-0.033 mm. in length).

The aulage of the female system can be recognized in segments with mature testes, lying ventrally between the poral and aporal groups. When mature the compact ovary measure 0.06-0.07 by 0.035-0.045 and lies ventrally below the inner end of the cirrus sac. The small yolk gland, about 0.026 mm. in diameter, is somewhat dorsal to the ovary. The small thin-walled receptaculum seminis lies on the aporal side of the vitellarium. The wide vagina travels inwards just behind and parallel with the cirrus sac to enter the seminal receptacle. Near the female pore it has well-developed muscle fibres.

The uterus develops ventrally and extends gradually till it occupies most of the segment. Eggs are about 29-35 μ in diameter; the onchospheres about 16-20 μ in diameter and their hooklets 9.5 μ long.

Immature forms. Several were recovered from the intestine of the same cormorant. One (Fig. 8) had not advanced much from the cysticeroid stage and measured 0.67 by 0.43 mm., with rostellar hooks 0.11 and 0.078 mm. in total length. The only one of the remainder still possessing hooks (Fig. 9) had already begun to form a strobila and measured 0.95 by 0.33 mm. with hooks 0.11 and 0.08 mm. long. Both contained numerous calcareous corpuscles.

Since this species seems to have been confused in Australian literature with *P. minima*, the systematic position of the two is discussed later.

Paradilepis minima (Goss 1940)

Figs. 10-16

Syn. *Dilepis minima* Goss 1940 (in part).

Numerous specimens of this small cestode were obtained from the stomach and intestine of three *Microcarbo melanoleucus*, syn. *Phalacrocorax ater* and from two *Phalacrocorax sulcirostris*, all taken at Tailcm Bend.

Egg-bearing worms measure 1.5-2.3 mm. in length and 0.26-0.38 mm. in maximum width. Youngest segments are 0.26-0.3 mm. broad and about 0.02

mm. long. As they mature they reach their maximum width and their length is about 0.037 mm., but they continue to lengthen as they become gravid when the dimensions may be 0.26-0.28 mm. in breadth and 0.15-0.17 mm. in length. Sometimes these latter tend to separate partly from their fellows so that the posterior part of the strobila may resemble a string of beads.

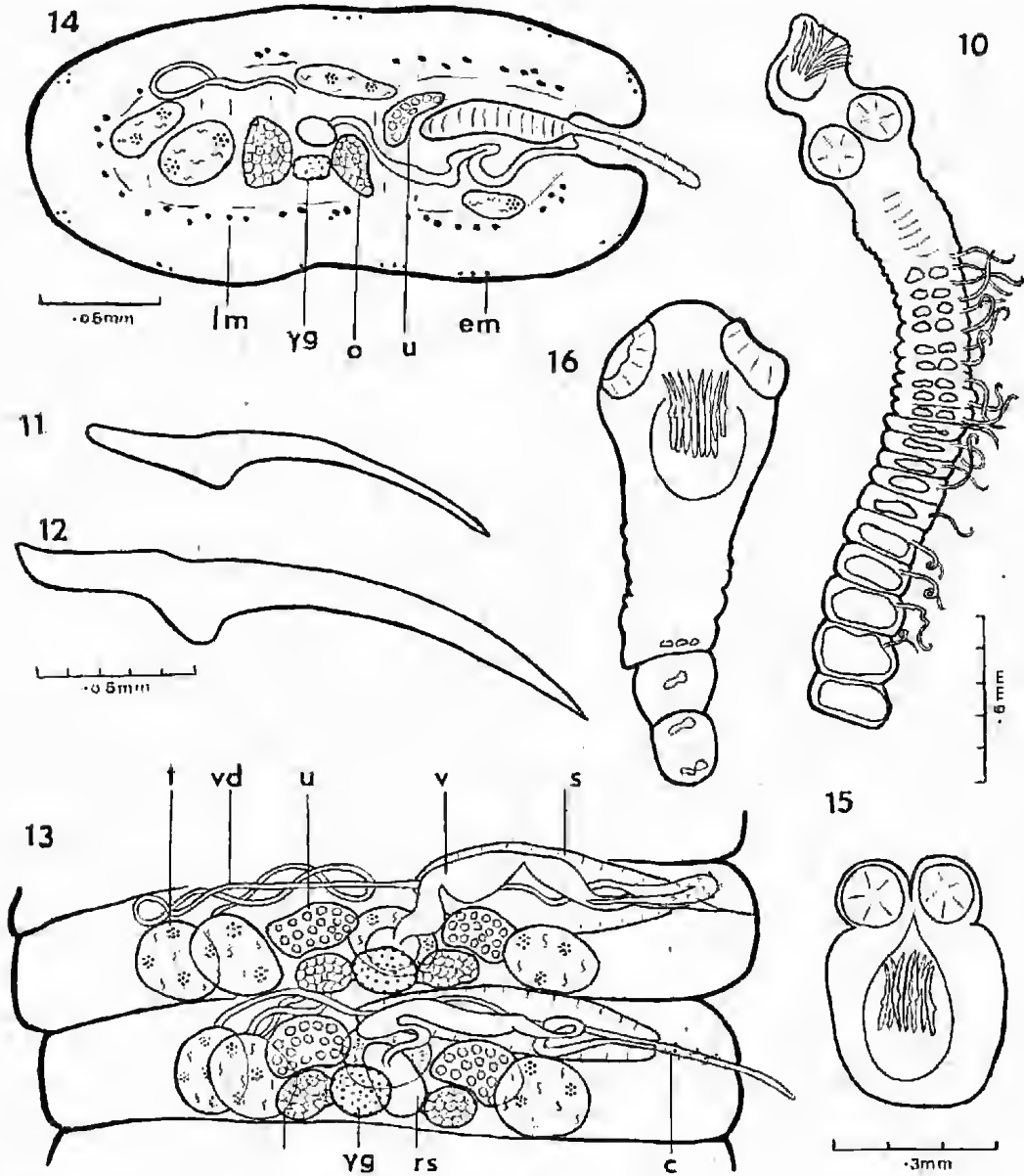


Plate 2.

Figs. 10-16.—*Paradilepis minima*. 10, mature cestode; 11 and 12, rostellar hooks; 13, ventral view of mature segments; 14, transverse section of same; 15 and 16, young forms. Figs. 11 and 12 to same scale; Figs. 13 and 14; Figs. 15 and 16. c, cirrus; cs, cirrus sac; m, outer ring of longitudinal muscle; lm, inner ring of longitudinal muscle; o, ovary; rs, receptaculum seminis; t, testis; u, uterus; v, vagina; vd, vas deferens; yg, yolk gland.

The scolex is not well marked off from the neck region. When the rostellum is fully everted the scolex is 0.44-0.49 mm. long by 0.33-0.34 mm. broad, the rostellum being 0.167-0.2 mm. long by 0.15-0.16 mm. wide. The rostellar sac is large and extends back almost to the posterior margin of the suckers; when the rostellum is retracted, the sac measured 0.22-0.33 mm. long by 0.15-0.19 mm. broad. The well-developed musculature associated with the sac and rostellum closely resembles that present in *P. scolecina*. There is a double crown of 28 alternating hooks, the anterior 14 being 0.18-0.19 (average 0.184 mm.) in total length, the posterior smaller hooks being 0.125-0.13 mm. (average 0.127). These hooks seem to become dislodged readily since few worms have retained the full number. The suckers are 0.11-0.155 mm. by 0.13-0.155 mm.

The musculature of the segments is arranged as in *P. scolecina*. The excretory canals were not recognized.

The four testes develop a little before the ovary and attain their maximum size in segments containing developing ovary and yolk gland. One testis is poral and lies ventrally to the large cirrus sac, one is median and dorsal to the ovary and the other two are aporal. When mature they measure 0.04-0.05 by 0.02-0.03 mm. The vas deferens is very long and thrown into coils dorsally in the anterior region of the segment, in front of the genital glands. On entering the cirrus sac it becomes somewhat coiled as an inner vesicula seminalis. The thin-walled sac lies in the anterior part of the segment, parallel with the front border, and may extend to the middle of the segment. Its size is 0.11-0.13 by 0.03-0.04 mm. in mature segments. The genital atrium is narrow and deep. The cirrus is very long, about 0.25 mm. in length. Its proximal region bears numerous rose-thorn spines, about 5μ across the base and 5μ from the base to the tip, these spines becoming smaller and less numerous towards the free end of the organ where only fine hairs are present. Segments containing mature ovaries also possess degenerating testes.

The mature ovary has two lobes connected by a relatively long isthmus. The yolk gland and the receptaculum lie ventrally between the lobes and in the posterior region of the segment. The yolk gland is about 0.037-0.04 by 0.026 mm.; and the receptaculum 0.03-0.04 by 0.02-0.03 mm. The latter is more dorsally placed than the yolk gland. The vagina lies just ventral to the cirrus sac and travels inwards from the atrium in a winding course more or less parallel with it to reach the receptaculum. The uterus develops as a bilobed sac which enlarges to occupy most of the gravid segment. Eggs measure 31-35 μ in diameter; the onchosphere 20-30 μ in diameter and the hooklets 9.5 μ in total length.

Immature forms (Figs. 15-16) were also recovered from the stomach and the intestine of one of the cormorants. The hooks measured 0.12-0.18 mm. in total length; the suckers 0.10-0.15 mm. in diameter; and the scolex 0.31-0.34 mm. broad. Some were almost cysticeroids, while in others segmentation had just commenced. These young forms were from 0.4-0.9 mm. in length. Since *Microcarbo melanoleucus* feeds on freshwater fish and yabbies (*Parachanna destructor*), the cysticeroids of *P. scolecina* and *P. minima* recorded by us probably developed in either the fish or the crustacean.

Relationship of *P. scolecina* and *P. minima*

Miss Goss very generously permitted us to re-examine some of her slides of *Paradilepis minima*. We find that two small species have been confused under that name and that her material from *Microcarbo melanoleucus* contains the same two species that we have described above. One has at least 26 hooks measuring about 0.17 and 0.12 mm. in total length, and cirrus with large rose-thorn spines suggestive of *P. minima*; the other has about 20 hooks measuring about 0.09 and 0.07 mm. in total length, and a cirrus armed with short hair-like

spines as in *P. scolecina*. In the original account of *D. minima* the larger hooks are reported as 0.11 mm. long and the smaller as 0.10 mm., but in the scolex figured by Miss Goss and re-examined by me, they measure about 0.16 and 0.11 respectively, while a figured hook is 0.12 mm.

Since most of the original account refers to the species with the larger hooks we have taken that as representing *P. minima*, and to it we assign Miss Goss' figures 23, 26-32; figure 25 might refer to either species. Though *D. minima* was reported to possess only three testes, a fourth was detected by us adjacent to and just in front of that figured as occurring on the aporal side of the segment. The account of the cirrus with backwardly directed spines 5μ long, the two-lobed ovary and the position of the testes (one of which is median, unlike the condition in *P. scolecina* where three are aporal and one poral, none central) indicates *P. minima*. The possession of four testes in the segment and of two rows of rostellar hooks places the two species in *Paradilepis* Hsü 1935. Joyeux and Baer (1950, p. 91) regard the genus *Paradilepis* as comprising only six species, which they list, together with their synonyms. They consider *Paradilepis scolecina* (Rudolphi 1819), *P. duboisi* Hsü 1935, and *P. brevis* Burt 1940 to be synonyms, and consequently we have identified our cestode as *Paradilepis scolecina*. Using the key they suggest *P. minima* (not included in their paper) is differentiated by its small size (strobila less than 10 mm.) from *P. macracantha* Joyeux and Baer 1936, *P. simoni* Rausch 1949, *P. kempi* (Southwell 1921) and *P. delachauxi* (Fuhrman 1909). *P. urceus* (Wedl 1855) and *P. scolecina* (Rudolphi 1819) both measure less than 10 mm., but both have 20 hooks, while *P. minima* has 28, and its hooks are larger.

Paradilepis sp.

Figs. 17-20

Two fragments of a cestode were obtained from a cormorant (*Microcarbo melanoleucus*) collected from the Adelaide Botanical Gardens in 1923. The length of the larger is 1 cm., and its maximum breadth 0.2 mm.; in its most mature segments the testes and cirrus sac are defined although still immature. The second specimen is only just beginning to segment.

The scolex measures 0.34-0.47 mm. in diameter and 0.5 mm. in length. In both specimens the rostellum is retracted; it carries 27 hooks arranged in two rows; the larger hooks measure 0.173-0.180 mm. total length, and the smaller 0.124-0.138 mm. total length. Their shapes are shown in figures 18 and 19. Of the 27 hooks, there are 13 large and 14 small ones; probably the complete number is 28. The rostellar sac measures about 0.16 mm. in diameter and 0.26-0.31 mm. in length; it extends back behind the posterior level of the suckers. The suckers are round (0.167 mm. in diameter) or elliptical (0.14 × 0.11-0.13 mm.) in shape.

There are four, occasionally five, testes situated on either side of, and behind, the developing female glands. Those in the ripest segments measure 0.03 mm. in diameter, but it is doubtful if they have reached their greatest size. The cirrus sac is not yet fully differentiated; it lies across the anterior part of the segment, reaching a little beyond the middle of the segment. In the most mature segments it measures 0.1 mm. long by 0.03 mm. broad.

The female glands are indicated by an aggregation of cells between the testes, but they are not differentiated. No excretory canals could be recognized.

This species belongs to the family Dilepididae Fuhrmann 1907, because of its four testes and double row of hooks. As there are no gravid segments we cannot be sure of its correct position, but record it as *Paradilepis* sp. Using the key suggested by Joyeux and Baer (1950, p. 91) it then belongs to the group of species exceeding 10 mm. in length, but can be distinguished from them by the number and size of its hooks.

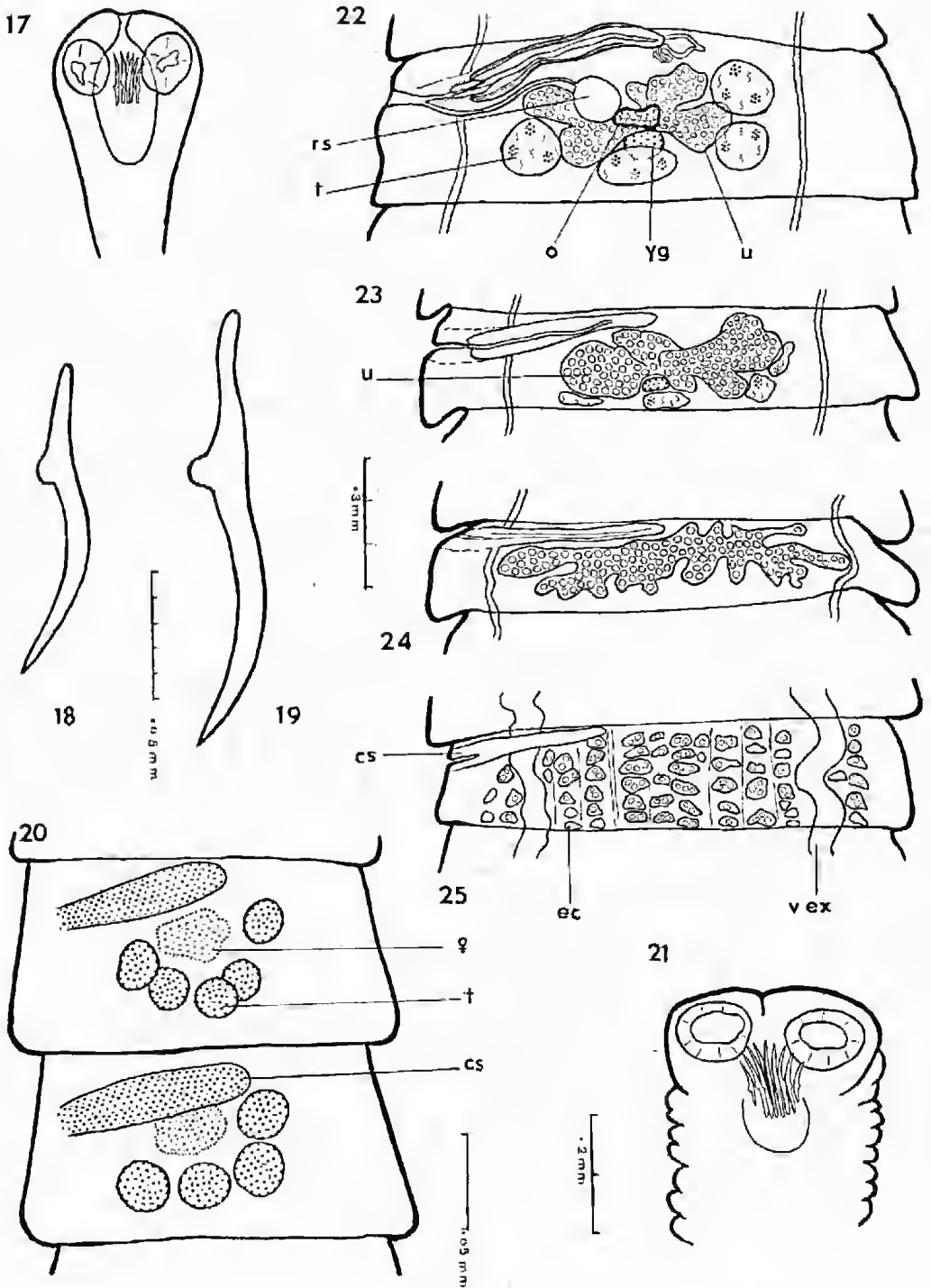


Plate 3.

Figs. 17-20.—*Paradilepis* sp. 17, scolex; 18 and 19, rostellar hooks; 20, immature segment. Figs. 21-25.—*Dilepis maxima*. 21, scolex; 22, dorsal view of segment with developing uterus; 23 and 24, dorsal view of segments with branching uterus; 25, dorsal view of segment with ovigerous capsules.

Figs. 17, 23, 24 and 25 to same scale; 21 and 22 to same scale; 18 and 19 to same scale. cs, cirrus sac; ec, egg capsules; o, ovary; rs, receptaculum seminis; t, testis; u, uterus; vex, ventral excretory canal; yg, yolk gland; ♀, aulage of female organs.

Dilepis maxima Goss 1940

Figs. 21-25

A specimen of *Dilepis maxima* Goss (1940) was recovered from a small black and white cormorant, *Microcarbo melanoleucus*, collected in Adelaide, South Australia, in 1923. Its total length is uncertain (at least 5 cm.), but its maximum breadth is 1.2 mm. The scolex has a diameter of 0.36 mm. The rostellum carries a double crown of 26-28 hooks, the larger of which measure 0.153 mm. total length, and the smaller 0.108 mm.; in shape they are similar to those figured by Miss Goss (1940). The four suckers measure 0.13 × 0.11 mm.

In our specimen the anterior end is contracted and there is no distinct neck before segmentation begins. The genital ducts pass dorsally to the excretory canals. The unilateral genital pore lies in the anterior third of the margin of the proglottid.

The four testes measure each 0.07-0.08 mm. in diameter; two are situated on the aporal side of the female glands, one in front of the other; the other two are poral, one to the side of the female glands, and the other behind them. They persist in segments with well-developed uterus. The vas deferens coils before entering the cirrus sac. The pair of spines at the base of the cirrus, referred to by Miss Goss, could not be seen, but the cirrus itself is spiny. The cirrus sac is large, extending from the genital atrium across the anterior part of the segment; it measures 0.30-0.37 mm. long × 0.03 mm. broad.

The mature ovary is median, and measures 0.07 mm. maximum diameter; the vitelline gland, situated directly behind it, measures 0.07 mm. in diameter. The vagina opens into the deep, narrow genital atrium just ventral and posterior to the opening of the cirrus sac; it runs parallel with the cirrus sac to the receptaculum seminis, which is situated dorsally in front of the ovary. At its largest, it measures about 0.08 × 0.05 mm. The uterus develops as two lobes which become branched, and finally break down into numerous egg capsules, extending laterally beyond the excretory canals, and containing each 1-20 eggs.

Our specimen is obviously *Dilepis maxima* Goss 1940, differing significantly from the original description only in the number of hooks (type specimen has 20) and in the size of the yolk gland (that of the type specimen measures 0.035 mm. in diameter). The type specimen may easily have lost several of its hooks, so that our number may be taken as more correct. The yolk gland in our specimen was measured from segments with developing uterus, which may account for its greater size. However, if the uterus really breaks down into ovigerous capsules, as it appears to do, this species does not belong to the genus *Dilepis*, which has a sac-like or lobed uterus, but to one of the genera of the subfamily Dipylidiinae. (The family Dilepididae Fuhrmann 1907 is divided into three subfamilies on the nature of the uterus; of these, the subfamily Dilepidiinae Fuhrmann 1907 includes those genera in which the uterus is sac-like, lobed or ramifying, and the subfamily Dipylidiinae (Stiles 1896) those in which the uterus breaks down into uterine capsules. (Fuhrmann 1932).) As we were not able to make certain that the appearance of the egg capsules is not due to a greatly ramifying and divided uterus, we have for the time left this species in its original genus.

Hymenolepis cormoranti Ortlepp 1938

Figs 26 and 27

Thirteen very small cestodes were obtained from a cormorant (*Microcarbo melanoleucus*) collected near Tailem Bend, South Australia, in March 1948. Unfortunately, none of the worms are mature, so that only a limited description of them can be given. The specimens measure up to 13 mm. long, with a maximum width of 0.3 mm. The scolex (Fig. 26) has a maximum diameter of

0.11-0.14 mm. It has a long rostellum ending in a bulb which carries the hooks; when fully everted the rostellum may be 0.44 mm. long. There is a single row of 10 hooks of similar shape and size, measuring 0.022 mm. total length. Their shape is shown in Figure 27. The four elliptical suckers measure 0.04-0.05 × 0.055-0.065 mm. The scolex narrows slightly to the neck. In the most mature segments present, which are 0.037 mm. long, some of the organs are foreshadowed by aggregations of cells, but nothing of their number or arrangement can be determined.

These specimens resemble in general form, and in number and size of their hooks, three species which have been described from cormorants elsewhere. These are *Hymenolepis cormoranti* Ortlepp 1938, from *Microcarbo africana africanaoides*, whose 10 hooks measure 0.024-0.025 mm.; *Hymenolepis childi* Burt 1940 from *Phalacrocorax niger* of Ceylon, whose 10 hooks measure 0.021-0.022 mm. and *Hymenolepis gyogonka* Julri 1941 from *Phalacrocorax javanicus* from Burma, whose 10 hooks measure 0.018-0.026 mm. All three cestodes are thin and delicate, and the arrangement and measurements of their internal organs do not differ significantly; none has such a long rostellum as our specimens, which may be because in none it is fully extended. Their hooks as figured, and those of our specimens, are all similarly shaped. Joyeux and Baer 1950 in a note to their paper consider that the three are synonyms. The South Australian specimens contain no mature segments, but in view of the close resemblance of the scolices to those of this group, they are provisionally identified as *H. cormoranti*.

Hymenolepis phalacrocorax (Woodland 1929)

Figs 28-31

Numerous specimens of this species were found in three little pied cormorants (*Microcarbo melanoleucus*) collected at Tailem Bend between 1938 and 1943 and one from the Adelaide Botanical Gardens collected in 1923. Unfortunately none has a scolex. The largest worms measure about 100 mm., with a maximum breadth of 1.14 mm., found in gravid segments. The unilateral genital pores are situated in the anterior third of the proglottid. All the segments are broader than long.

The muscular system is similar to that described by Woodland, the inner ring of longitudinal muscle fibres consisting of eight large bundles, four dorsal and four ventral. Immediately external to these is the outer ring of longitudinal muscle fibres, which is strongly developed. Both these rings lie within the ring of circular muscles, and are therefore medullary in position. There are the usual two pairs of longitudinal excretory vessels; the ventral ones are large (external diameter up to 44 μ) and the dorsal narrower with thicker walls (external diameter about 11 μ). No transverse excretory canals were observed. The genital ducts pass dorsally to the excretory vessels.

There are three testes, one poral and two aporal. As the segments are very short, they are usually transversely elongate, measuring 0.08-0.13 × 0.07-0.09 mm. Their position with reference to the excretory vessels appears to vary. Usually the mature poral testis fills the dorso-ventral space behind the cirrus sac, most of it lying laterally to the excretory vessels. Both of the two aporal testes are crossed ventrally by the excretory vessels, the outer of the two being practically lateral to it, and the inner, practically median. All three testes lie between the longitudinal nerve cords. In segments with mature ovaries, the testes are completely lateral to the excretory canals, as figured and described by Woodland. There is an external seminal vesicle which may become extremely large; in segments with developing uterus, in which it is filled with sperms, it may measure 0.09-0.11 mm. wide, and fill the central portion of the segment. It begins

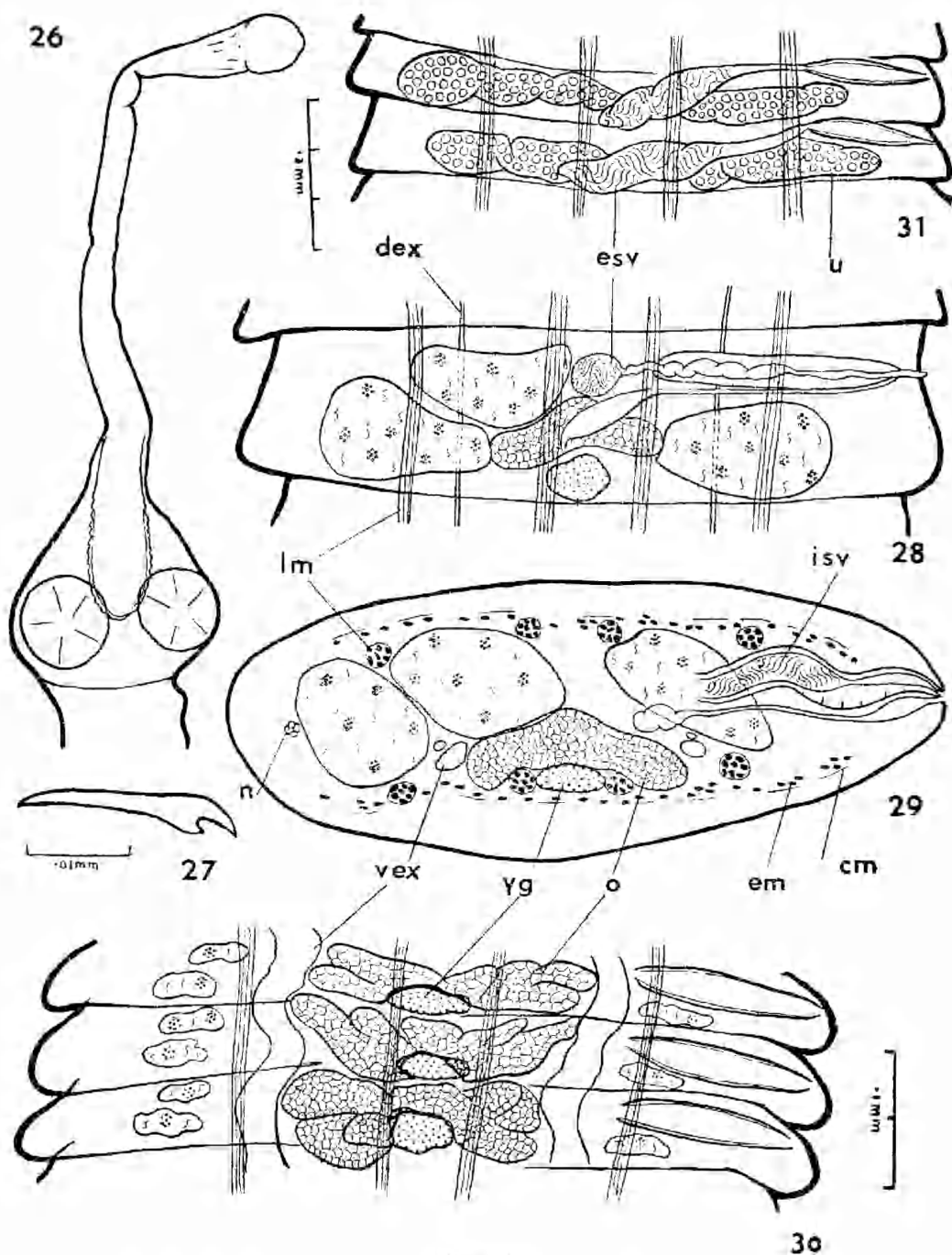


Plate 4.

Figs. 26-27.—*Hymenolepis cormoranti*. 26, scolex with rostellum everted; 27, rostellar hook. Figs. 28-31.—*Hymenolepis phalacrocorax*. 28, dorsal view of segment with mature testes; 29, transverse section of same; 30, dorsal view of segment with mature ovary; 31, dorsal view of segments with developing uterus. Figs. 26, 28, 29 and 30 to same scale. cm, circular muscle; dex, dorsal excretory canal; m, outer ring of longitudinal muscle; esv, external seminal vesicle; isv, internal seminal vesicle; lm, inner ring of longitudinal muscle; vex, ventral excretory canal; yg, yolk gland.

abruptly below the cirrus sac and runs across the segment to the aporal excretory vessel, where it turns and comes back to enter the cirrus sac as vas deferens. Within the cirrus sac the vas deferens widens into an internal seminal vesicle which fills the cirrus sac when full of sperms. The cirrus itself is short (0.03-0.04 mm. long) and does not appear spiny. The genital atrium is shallow. The cirrus sac extends nearly up to or slightly beyond the poral excretory vessels. It measures 0.15-0.24 × 0.02-0.05 mm. in mature segments.

The bilobed ovary is large, measuring up to 0.20 mm. across when fully developed, extending between the excretory vessels that is, filling about one-third of the segment. Each lobe is subdivided into several smaller lobes. The slightly lobed yolk gland (0.048-0.055 × 0.02 mm.) is situated behind the ovary in its concavity. The receptaculum seminis is inconspicuous, appearing usually as a dilation of the vagina in the region of the ovary and dorsal to it. The vagina runs obliquely from the genital atrium to the region of the ovary. It opens into the genital atrium immediately ventral to the cirrus sac in the same transverse plane. The uterus develops as two transverse lobes on either side of the ovary, extending well beyond the excretory canals and behind the cirrus sac to the edges of the segment. In gravid segments the uterus appears as one large sac which fills the segment in which all the organs have degenerated except the cirrus sac and the large external seminal vesicle. Occasionally there are marginal uterine swellings similar to those described by Woodland. The eggs measure 23-25 μ in diameter and the onchospheres 12-15 μ , with small hooks measuring about 7 μ long.

As can be seen, the description of this species differs in certain respects from that of Woodland. We were not able to observe the detail of the cirrus sac described by him. The testes of our specimens are completely lateral to the excretory vessels (as described by Woodland) only in segments that are past their maturity. Baer 1933 in his description of specimens of this species also seems not to have found the testes lateral in position in young or immature segments. Again, the uterus of our specimens occasionally had lateral swellings, but they are not a constant feature, as they are in Woodland's specimens. However, these differences may in part be due to the state of contraction of the worms, and do not seem to justify the creation of a new species, so we prefer to record our specimens as *Hymenolepis phalacrocorax* (Woodland 1929).

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